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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/726,232	12/01/2003	Brian H. Moeckly	844,004-303	3720

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EXAMINER	
VIJAYAKUMAR, KALLAMBELLA M	
ART UNIT	**PAPER NUMBER**
1751	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/17/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/726,232	MOECKLY ET AL.	
	Examiner	Art Unit	
	Kallambella Vijayakumar	1751	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 January 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *13 and 24* is/are allowed.

6)☒ Claim(s) *1-12, 14-23, 25-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

- Claims 1-31 are currently pending with the application. Claims 1, 6, 11, 13-14, 22, 24-28 were amended. New claims 30-31 added.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 14, 26 and 28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification does not disclose "a substantially sealed" reaction zone from the depressurized deposition zone in the claims 1, 14, 26 and 28, and a depressurized zone with a pressure less than 10^{-5} Torr in claim-26.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 14, 26 and 28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "substantially sealed" in claims 1, 14, 26 and 28 is a relative term which renders the claim indefinite. The term "substantially sealed" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be

reasonably apprised of the scope of the invention. If a factor of 10 on a scale of 1-10 make the system sealed, how many factors make the system "substantially sealed" per the applicant's instant claim/s limitation.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 26, 28-31 are rejected under 35 U.S.C. 102(a/e) as being anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Matijasevic et al (US 6,527,866).

The prior art teaches a an apparatus and method of making thin films of superconducting materials over a substrate by depositing the metallic components in a plurality of depositing zones and reacting them in same number of reaction zones by alternating/rotating the substrate between these zones and finally with a gaseous element such as oxygen in a reaction zone forming the thin film of the compound (Abstract; Fig 1-10; Cl-1, Ln 27-45; Cl-5, Ln 8-Cl-10, Ln 44). The substrates included sapphire, silicon, alumina and magnesia (Cl-3, Ln 66-Cl-4, Ln 8). The thin film included CMR materials, superconducting YBCO and BSCCO, and a compound with the formula A1-xBx (Cl-3, Ln 26-42; Cl-6, Ln 60-65). The pressure in the deposition chamber was about 0.0001-.01Pa and that of the reaction chamber was 0.5-20Pa that meets the limitation of substantially sealed in the claims (Cl-5, Ln 15-17; Cl-8, Ln 64-67). The prior art further teaches heating either the sample or entire

zone in the range of 600-800C (Cl-5, Ln 37-40). The disclosure in the prior art meets the limitation various process steps claimed by the instant claims 26 and 28. All the limitations of the instant claims are met.

The reference is anticipatory.

In the alternative that the disclosure by Matijasevic et al be insufficient to arrive at the limitations of the instant claims, it would be obvious to optimize the process steps as choice of design of making the thin films with reasonable expectation of success, because prior art is suggestive that various modifications equivalent processes as well as numerous structures will be readily apparent to a those of skill in the art (Cl-10, Ln 40-44).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the

examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

1. Claims 1-12, 14-23, 25 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matijasevic et al (US 6,527,866) in view of Kim et al (6,626,995).

The disclosure on the apparatus and method of making the superconductor film over a substrate by Matijasevic et al as set forth in rejection-1 under 35 USC 102(a/e)/103(a) is herein incorporated. The prior art further teaches the apparatus and the process can be used with any material that can be evaporated and optimizing the relative sizes of the reaction and deposition zones based on the stoichiometry of a binary compound such as A1-xBx (Cl-6, Ln 32-33; 52-67).

The prior art fails to teach a method of making a MgB2 superconductor film per the limitations of the instant claims by the applicants.

In the analogous art, Kim teaches a method of making the MgB2 superconductor film by depositing a non-stoichiometric compound on a substrate and then exposing it to Mg vapor between 400-900C (Abstract, Fig 5A, 5B, 6A, and 6B) using an e-beam (Cl-4, Ln 25-26; 55-61), or by depositing boron film over a substrate and then exposing it to Mg vapors at 400-900C (Cl-5, Ln 32-43) in a vacuum apparatus (Cl-5, Ln 14-19). The prior art teaches the substrates for the films to be SiC, MgO and SrTiO3 (Cl-3, Ln 46-59, Cl-4, Ln 1-8).

It would have been obvious to a person of ordinary skilled in the art to substitute the targets in the apparatus and process of making superconductor film by Matijasevic et al with Mg and B targets of Kim et al as functional equivalents with reasonable expectation of success, because Matijasevic et al teaches that any material that can be evaporated can be used, and the combined prior art teaching is suggestive of the claimed process steps. With regard to electron beam gun in claim-14, the prior art teaches an e-gun evaporation of target materials (Cl-6, Ln 25-27).

With regard to claim-2, the prior art teaches the rotation of the substrate.

With regard to claims 3-4, 6, 11, 15-17, 22 and 25, the prior art teaches rotating the substrate, heating the substrate between 600-800C, a depositing chamber pressure of 0.0001-0.01 Pa and a reactant pressure of 0.2-20 Pa which are known variables that can be optimized by routine experimentation by a

person of skilled in the art. Generally, differences in concentration, pressure, rotation or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration, pressure rotation or temperature is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

With regard claims 5, 8 and 18-19, It would have been obvious to a person of ordinary skilled in the art to utilize such as SiC, MgO and SrTiO3 (Cl-3, Ln 46-59, Cl-4, Ln 1-8) of Kim et al in the apparatus and process of Matijasevic et al as functional equivalents of substrates with reasonable expectation of success because the combined prior art teaching is suggestive of the claimed substrates. The substrate containing a layer of MgO meets the limitation of a wafer in the claims.

With regard to claim-7, the combined prior art teaching is suggestive of a Mg target .

With regard to claims 9 and 20, the prior is silent about nature of the substrate being a tape i.e. a rectangular substrate, and use of rectangular substrate in coating the film would be obvious to a person of ordinary skilled in the art over the teachings of Zheng forming a tape by depositing a thin film of MgB2 superconductor on a substrate in a static apparatus (US 6,797,341; Cl-1, Ln 17-18).

With regard to claims 10, 12, 21 and 23, the prior art teaches multiple substrate holders with multiple chambers thus processing of plurality of substrates, and further coating the superconductor over at least one face of a substrate would be obvious.

Forming a MgB2 film per claim 27 would be obvious over the combined prior art teachings.

Allowable Subject Matter

Claims 13 and 24 allowed.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kallambella Vijayakumar whose telephone number is 571-272-1324. The examiner can normally be reached on 8.30-6.00 Mon-Thu, 8.30-5.00 Alt Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Douglas McGinty can be reached on 571-272-1029. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KMV
April 11, 2007.

DOUGLAS MCGINTY
SUPERVISORY PATENT EXAMINER

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